

**ABSTRACT**

The present invention provides an RF module capable of converting electromagnetic waves in the TE mode to balanced electromagnetic waves in the TEM mode without adjustment and outputting the balanced electromagnetic waves while easily realizing miniaturization. The RF module includes: a waveguide (3) in which a half-wavelength TE mode resonator (2) is formed; an E plane coupling window (4) formed in a wall portion (3a) orthogonal to an H plane out of wall portions (3a) to (3e) constructing the TE mode resonator (2) in the waveguide (3); an output line (5a) provided at the edge on the side of the wall portion (3d) parallel with the H plane on the E plane coupling window (4), and magnetically coupled to electromagnetic waves in the TE mode resonator (2); and another output line (5b) provided at the edge on the side of the wall portion (3e) parallel with the H plane in the E plane coupling window (4), and magnetically coupled to the electromagnetic waves.